

What is claimed is:

1. A thin-film capacitor device comprising:

a lower electrode formed on a surface of a core substrate;

a dielectric film generated from a metal film formed on said lower electrode;

an upper electrode formed on said dielectric film; and

a first conductor extending from said lower electrode toward an opposite surface of said core substrate, wherein

a first electrode pad is provided on said first conductor and a second electrode pad is provided on a second conductor connected to said upper electrode.

2. A thin-film capacitor device as claimed in claim 1, wherein

said first conductor is filled into a groove formed in said core substrate when forming said lower electrode thereon, and

said opposite surface of said core substrate is formed by grinding said core substrate until said groove is exposed.

3. A thin-film capacitor device as claimed in claim 2, wherein said metal film is made of tantalum or titanium, and

said dielectric film is generated by anodic oxidation of said tantalum or titanium.

4. A thin-film capacitor device as claimed in claim 2, wherein

by selective anodic oxidation, said metal film is divided into a dielectric film region and a first and a second metal film region,

said first conductor connected to said lower electrode is connected to a lower surface of said first metal film region,

a third conductor is connected to an upper surface of said first metal film region,

said second conductor connected to said upper electrode is connected to an upper surface of said second metal film region, and

a fourth conductor is connected to a lower surface of said second metal film region, and wherein

first to fourth electrode pads are provided on said first to fourth conductors, respectively, and a capacitor is formed by said dielectric film region, said upper electrode, and said lower electrode.

5. A thin-film capacitor device as claimed in claim 4, wherein said metal film is made of tantalum or titanium, and

said dielectric film is generated by anodic oxidation of said tantalum or titanium.

6. A thin-film capacitor device mounting module containing a thin-film capacitor device and a multilayer wiring circuit having external connection terminals, wherein

said thin-film capacitor device comprises:

a dielectric film region and a first and a second metal film region into which a metal film formed on a core substrate is divided by selective anodic oxidation;

a first conductor connected to a lower electrode at a lower surface of said first metal film region;

a third conductor connected to an upper surface of said first metal film region;

a second conductor connected to an upper electrode at an upper surface of said second metal film region; and

a fourth conductor connected to a lower surface of said second metal film region, and wherein:

first to fourth electrode pads are provided on said first to fourth conductors, respectively, and a capacitor is formed by said

dielectric film region, said upper electrode, and said lower electrode, and

said first electrode pad and said fourth electrode pad provided on said thin-film capacitor device are connected to said multilayer wiring circuit, and a semiconductor device is connected to said second electrode pad and said third electrode pad provided on said thin-film capacitor device.

7. A thin-film capacitor device mounting module as claimed in claim 6, wherein

said module contains a plurality of said thin-film capacitor devices, and

said first electrode pad and said fourth electrode pad provided on each of said thin-film capacitor devices are connected to said multilayer wiring circuit.

8. A thin-film capacitor fabrication method comprising the steps of:

after forming a groove to a prescribed depth in a first surface of a core substrate, filling a first conductor into said groove while, at the same time, forming a first conductive film on said first surface;

after forming a metal film on said first conductive film, generating a dielectric film by anodic oxidation of said metal film;

forming a second conductive film on said dielectric film, and forming a first electrode connected to said second conductive film; and

after removing a second surface portion from an opposite surface of said core substrate, forming a second electrode for connection to said first conductor in said groove.

9. A thin-film capacitor fabrication method as claimed in claim 8, wherein said metal film is made of tantalum or titanium, and

said dielectric film is generated by anodic oxidation of said tantalum or titanium.

10. A thin-film capacitor fabrication method as claimed in claim 8, including the steps of:

after forming a first groove and a second groove spaced apart from each other in said first surface, filling said first conductor into said first and second grooves while, at the same time, forming said first conductive film on said first surface;

generating said dielectric film in a portion of said metal film which corresponds to a portion where neither said first groove nor said second groove is formed;

separating said first conductive film formed on said first and second grooves by an insulator;

after removing a portion of said second conductive film on said metal film which corresponds to a portion where said first groove is formed, forming on said metal film a third electrode insulated from said second conductive film; and

forming a fourth electrode which is connected to said first conductive film filled into said second groove and is insulated from said second electrode.

11. A thin-film capacitor fabrication method as claimed in claim 10, wherein said metal film is made of tantalum or titanium, and

said dielectric film is generated by anodic oxidation of said tantalum or titanium.